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Keith Feigenbaum
CISR

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Alternatives to Anti-Personnel Landmines

The complexity of the issue of alternatives to AP landmines is great from both a humanitarian and a technical standpoint. Stances on this issue seem to range from the substantive and supported (by research and field experience) and the reactionary (i.e., unbending humanitarianism). When the differing stances are considered, the one conclusion that can be drawn is the need for the discovery of a middle ground. That is, given current levels of technology, what can be done to end the suffering of the innocent while protecting the combatant?

This is hardly a new issue. In fact, it has been addressed in various settings for decades. The U.S. Army Field Manual on *The Law of Land Warfare* (U.S. Army 1956) reads, "The loss of life and damage to property must not be out of proportion to the military advantage to be gained." It adds that noncombatants (civilians) must be protected from "unnecessary suffering." Such is the main issue at hand today, as it was addressed over 100 years ago by the Declaration of St. Petersburg (1868), which banned the use of exploding bullets, and, more recently, at the Convention on Certain Conventional Weapons (1996) that under Protocol IV banned the use of blinding lasers (Gard 1999).

The value of AP mines is hardly a cut and dry issue. Although it's difficult to draw conclusions or form an indisputable consensus, the U.S. Department of Defense clearly states its primary objective: destroying the enemy armed force as soon as feasible with the fewest possible friendly casualties. Former Chairman of the Joint Chiefs of Staff John M. Shalikashvili said in 1995: "Congress and the American people expect us to fight and win conflicts with minimum casualties." Meanwhile, the Under Secretary of Defense for Policy said in 1997 that AP mines are necessary "to safeguard American lives and hasten an end to fighting" (Gard 1999).

This said, the outcry for mine alternatives and the resulting mine countermeasures market still echoes loudly in the United States and abroad. According to a press release by Frost & Sullivan entitled "New Strategic Uses of Mine Countermeasures Could Offset Budget Restrictions," the mine countermeasures market generated revenues of \$397.8 million in 1999, a 17.4 percent increase from 1998. Frost & Sullivan credits the "growth of NGOs with the goal of removing mines for humanitarian purposes" with stimulating the market growth.

Much of the market stimulus also stems from a Landmine Policy Announcement made in May 1996 by President Bill Clinton that expressed a desire to "end reliance on [AP mines] as soon as possible." The result was a DoD three-track approach to solving the mine alternative equation (*Jane's Defence Weekly*, "Towards the 'smart' mine," July 19, 2000).

by Keith Feigenbaum,
MAIC

DoD Three Track System

Track I

Track I seeks to end the use of self-destruct (SD) and non-self-destruct (NSD) landmines outside Korea by 2003, and in Korea by 2006. "The technologies basically are to take a munition receiver that receives a radio frequency signal from a transmitter or a control unit and some sort of a sensing device—in this case what we used were triplines—which is triggered by an intruder," said John Rosamilia, Mines Division Chief of the Office of the Project Manager for Mines, Countermine and Demolitions. "That sends a signal back to the laptop controller where the operator, based on his forward observer's observation of the field and his situational awareness, makes the determination that it is a bad guy, and he in turn then fires the munition that has been triggered" (*Jane's Defence Weekly*). This system is commonly characterized as a "man-in-the-loop" (MITL) design. The de-

Alternatives... Alternatives... Alternatives

sign was considered by some critics to be too susceptible to failure in the case of invasion by a superior number of intruders—a theory rebuked in U.S. Army field assessments.

The second part of Track I is known as RADAM, a combination of the Remote Anti-Armor Munition System (RAAM) and the Area Denial Artillery Munition (ADAM) developed under Presidential Decision Directive 64. This \$180 million program is seeking to eliminate the ADAM projectile from arsenals through the combination of systems. The program was approved in November 1997 by the Secretary of Defense and includes the fabrication of about 400,000 projectiles that can be fired from U.S. 155mm cannons.

The inclusion of RADAM in Track I has not come without controversy. Col. Paul Hughes, a developer of landmine alternative activities for the Office of the Deputy Assistant Secretary of Defense for Peacekeeping and Humanitarian Affairs, said, "Since RADAM seems to be just another landmine program, how can the United States place [it] under the second part of its Track I alternatives effort?" (*Jane's Defence Weekly*)

Track II

The second alternatives track seeks longer-term solutions, specifically to maneuver denial. It is under the direction of the Defense Advanced Research Projects Agency (DARPA). DARPA's approach to mine alternatives is also twofold. First, it is developing a "Self-Healing Mine Field" that uses intelligent AT mines rather than AP mines (traditionally, the AP mines function as guards for the AT mines, which can be disabled by dismounted soldiers). In the Self-Healing Mine Field, AT mines detect a breach of security through mine-to-mine communication and consequently reposition mines to fill in the breach. This system provides an alternative to the mixed system.

DARPA Director Frank Fernandez explained the second aspect of Track II to *Jane's Defence Weekly*: "The program is investigating the tagging of dismounted enemy soldiers with small, burr-like radio frequency transmitters. These transmitters will detect enemy soldier movement and provide precise location information to allow soldiers to be targeted with short-range indirect fire. In FY00, one aspect of DARPA's efforts, the program is investigating the feasibility of developing and deploying radio frequency transmitters. In FY01, the program will assess viable candidate radio frequency tagging technologies to further determine the capabilities of this concept."

Track III

The final aspect of the DoD's three-track system involves developing technology that will allow for mine fields containing both AP and AT munitions that are either not detonated by victims or are non-lethal. That is, these types of munitions would be detonated by a second party (similar to the MITL idea) or be debilitating to a military operation, though not to an individual who activates the mine. However, one major concern expressed with this track is how the technologies developed will fit under the legal definitions of the Ottawa Convention.

Other Alternatives

According to Lt. Gen. Gard, numerous alternatives to landmines exist in the form of other weapons. In his essay on mine alternatives, he lists the following viable alternative weapons:

- Area denial bomblets;
- The Multiple Launch Rocket System (MLRS), a tracked vehicle that can fire a "ripple" of 12 M26 rockets. These cover an area of up to 200,000 sq. m to a range of 32 km; and
- The Extended Range MLRS, which has a range of 45 km.

Alternatives... Alternatives... Alternatives

Gard also includes in his analysis a wide range of AT submunitions. These include the following:

- The TERM-KE 120 mm Tank Munition, a rocket-assisted projectile that can destroy advanced armored vehicles at extended ranges;
- The Combined Effects Munition (CEM), which is deliverable by aircraft; and
- The Brilliant Anti-Armor Technology munition (BAT). This device is "an unpowered aerodynamically stable glider that employs acoustic and infrared sensors to find, attack and destroy armored vehicles on the move deep in enemy territory."

Gard notes in his analysis that while these weapons (plus a number of others not mentioned in this article) could be used in place of AP mines, "modif[ie]d military doctrine and tactical concepts" could also be instituted as an equivalent plan.

Alternative Critiques

Despite concerted efforts to find mine alternatives, such as the three-track program, critics still argue that the efforts are futile or misdirected. Some experts say that there are other tactics, techniques and weapons available to combat foot soldiers. Yet these alternatives have not necessarily been comprehensively laid out.

While serving as chairman of the Joint Chiefs of Staff, Gen. Shalikashvili said, "A moratorium on APL constitutes an increased risk to the lives of U.S. forces. It is the professional judgement of the Joint Chiefs of Staff and the geographic Combatant Commanders that the loss of APL... without a credible offset, will result in unacceptable risks to U.S. forces." Currently, only a "credible offset" will change the reality expressed by Gen. Shalikashvili. Such is the mission of such technologies as RADAM and the man-in-the-loop.

"[NATO allies] are all watching what the United States is doing," said Col. Hughes. "The concepts that are being put forward by and large revolve around the man-in-the-loop idea... And we're having a tough time trying to think around the target identification issue without having a person there. We simply don't have sensor technologies yet that can discriminate between a combatant and a non-combatant."

The crucial idea expressed in the previous quotation is a lack of technology. While military advancements are many and rapid in this age of computerization, no alternative technology to AP mines has advanced beyond the development stages. Some critics say this technology never will develop; others argue that even if a viable alternative is developed, such as a system that autonomously discerns between friendly combatants and enemies, civilians and attackers, it will, in all likelihood, violate the Ottawa Convention.

At this point, such conjecture will not end the search for a suitable alternative. In the meantime, millions of dollars (the United States is devoting about \$900 million to alternatives investigations) will continue to be devoted to finding the technology that effectively protects the innocent and fits within the guidelines of the Ottawa Convention, both practically and semantically. ■

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